AMENDMENTS

To the Claims:

Claim 1. (currently amended) An UV photodetector, comprising:

a substrate;

a GaN-based semiconductor layer, disposed on the substrate, wherein the GaN-based semiconductor layer comprises a first protrusion portion, wherein the GaN-based semiconductor layer comprising:

a nucleation layer, disposed on the substrate;

an ohmic contact layer, disposed on the nucleation layer, wherein the ohmic contact layer comprises a second protrusion portion;

an active layer, disposed on the second protrusion portion, wherein the first protrusion portion is constructed by the second protrusion portion of the ohmic contact layer and the active layer;

a high-resistivity GaN-based interlayer for reducing leakage current, disposed on the first protrusion portion of the GaN-based semiconductor layer, and a material of the GaN-based interlayer comprising $Al_xIn_yGa_{1-x-y}N$, wherein $x \geq 0$, $y \geq 0$, $1 \geq x + y$;

a first electrode, disposed on the GaN-based interlayer; and

a second electrode disposed on a portion of the GaN-based semiconductor layer except for the first protrusion portion.

Claim 2. (original) The UV photodetector of claim 1, further comprising a first

bonding pad, wherein the first bonding pad is disposed on the first electrode.

Claim 3. (original) The UV photodetector of claim 1, further comprising a second bonding pad, wherein the second bonding pad is disposed on the second electrode.

Claim 4. (original) The UV photodetector of claim 1, wherein the substrate is comprised of an aluminum oxide (sapphire) substrate, a silicon carbide (SiC) substrate, a zinc oxide (ZnO) substrate, a silicon substrate, a gallium phosphide (GaP) substrate, and a gallium arsenide (GaAs) substrate.

Claim 5. (original) The UV photodetector of claim 1, wherein the high-resistivity GaN-based interlayer is constructed by doping at least one dopant selected from a group consisting of iron (Fe), magnesium (Mg), zinc (Zn), copper (Cu), arsenide (As), phosphorus (P), carbon (C) and beryllium (Be) or by a GaN-based semiconductor layer formed by a low temperature process (a temperature of growth less than 800°C).

Claim 6. (cancelled)

Claim 7. (previously presented) The UV photodetector of claim 1, wherein a material of the nucleation layer comprises $Al_aIn_bGa_{1-a-b}N$ semiconductor, wherein a, $b \geq 0$ and $0 \leq a + b \leq 1$.

Claim 8. (previously presented) The UV photodetector of claim 1, wherein a material of the ohmic contact layer comprises N-type $Al_cIn_dGa_{1-c-d}N$ semiconductor, wherein c, $d \geq 0$ and $0 \leq c + d \leq 1$.

Claim 9. (previously presented) The UV photodetector of claim 1, wherein a material of the active layer comprises undoped $Al_eIn_fGa_{1-e-f}N$ semiconductor, wherein e, $f \geq 0$ and $0 \leq e + f \leq 1$.

Claim 10. (original) The UV photodetector of claim 1, wherein a material of the first electrode and the second electrode comprises Ni/Au, Cr/Au, Cr/Pt/Au, Ti/Al, Ti/Al/Ti/Au, Ti/Al/Pt/Au, Ti/Al/Ni/Au, Ti/Al/Ti/Au, Ti/Al/Pd/Au, Ti/Al/Cr/Au, Ti/Al/Co/Au, Cr/Al/Cr/Au, Cr/Al/Pt/Au, Cr/Al/Pd/Au, Cr/Al/Ti/Au, Cr/Al/Co/Au, Cr/Al/Ni/Au, Pd/Al/Ti/Au, Pd/Al/Pt/Au, Pd/Al/Ni/Au, Pd/Al/Pd/Au, Pd/Al/Cr/Au, Pd/Al/Co/Au, Nd/Al/Pt/Au, Nd/Al/Ti/Au, Nd/Al/Ni/Au, Nd/Al/Cr/Au Nd/Al/Co/A, Hf/Al/Ti/Au, Hf/Al/Pt/Au, Hf/Al/Ni/Au, Hf/Al/Pd/Au, Hf/Al/Cr/Au, Hf/Al/Co/Au, Zr/Al/Ti/Au, Zr/Al/Pt/Au, Zr/Al/Ni/Au, Zr/Al/Pd/Au, Zr/Al/Cr/Au, Zr/Al/Co/Au, TiN_x/Ti/Au, TiN_x/Pt/Au, TiN_x/Ni/Au, TiN_x/Pd/Au, TiN_x/Cr/Au, TiN_x/Co/Au, $TiWN_x$/Ti/Au, $TiWN_x$/Pt/Au, $TiWN_x$/Ni/Au, $TiWN_x$/Pd/Au, $TiWN_x$/Cr/Au, $TiWN_x$/Co/Au, NiAl/Pt/Au, NiAl/Cr/Au, NiAl/Ni/Au, NiAl/ Ti/Au, Ti/NiAl/ Pt/Au, Ti/NiAl/ Ti/Au, Ti/NiAl/Ni/Au, Ti/NiAl/Cr/Au, N-type conductive indium tin oxide (ITO), cadmium tin oxide (CTO), aluminum zinc oxide (ZnO:Al), indium

zinc oxide (ZnO:In), zinc gallate ($ZnGa_2O_4$), SnO_2:Sb, Ga_2O_3:Sn, $AgInO_2$:Sn, In_2O_3:Zn, P-type conductive $CuAlO_2$, LaCuOS, NiO, $CuGaO_2$ or $SrCu_2O_2$.

Claim 11. (currently amended) An UV photodetector, comprising:

a substrate;

a GaN-based semiconductor layer, disposed on the substrate, wherein the GaN-based semiconductor layer comprising:

a nucleation layer, disposed on the substrate;

an active layer, disposed on the nucleation layer, wherein a material of the active layer comprises undoped $Al_eIn_fGa_{1-e-f}N$ semiconductor, wherein e, $f \geq 0$ and $0 \leq e + f \leq 1$;

a high-resistivity GaN-based interlayer for reducing leakage current, disposed on the GaN-based semiconductor layer, and a material of the GaN-based interlayer comprises $Al_xIn_yGa_{1-x-y}N$, wherein $x \geq 0$, $y \geq 0$, $1 \geq x + y$;

a first electrode; and

a second electrode, wherein the first electrode comprises a plurality of first finger-shaped protrusions, the second electrode comprises a plurality of second finger-shaped protrusions, and the first finger-shaped protrusions and the second finger-shaped protrusions are mutually interlaced.

Claims 12-13. (cancelled)

Claim 14. (previously presented) The UV photodetector of claim 11, further comprises a first bonding pad, wherein the first bonding pad is disposed on the first electrode.

Claim 15. (previously presented) The UV photodetector of claim 11, further comprises a second bonding pad, wherein the second bonding pad is disposed on the second electrode.

Claim 16. (original) The UV photodetector of claim 11, wherein the substrate is comprised an aluminum oxide (sapphire) substrate, a silicon carbide (SiC) substrate, a zinc oxide (ZnO) substrate, a silicon substrate, a gallium phosphide (GaP) substrate, and a gallium arsenide (GaAs) substrate.

Claim 17. (original) The UV photodetector of claim 11, wherein the high-resistivity GaN-based interlayer is constructed by doping at least one dopant selected from a group consisting of iron (Fe), magnesium (Mg), zinc (Zn), copper (Cu), arsenide (As), phosphorus (P), carbon (C) and beryllium (Be) or by a GaN-based semiconductor layer formed by a low temperature process (a temperature of growth less than 800°C).

Claim 18. (cancelled)

Claim 19. (previously presented) The UV photodetector of claim 11, wherein a material of the nucleation layer comprises $Al_aIn_bGa_{1-a-b}N$ semiconductor, wherein a, $b \geq 0$ and $0 \leq a + b \leq 1$.

Claim 20. (cancelled)

Claim 21. (original) The UV photodetector of claim 11, wherein a material of the patterned electrode layer comprises Ni/Au, Cr/Au, Cr/Pt/Au, Ti/Al, Ti/Al/Ti/Au, Ti/Al/Pt/Au, Ti/Al/Ni/Au, Ti/Al/Ti/Au, Ti/Al/Pd/Au, Ti/Al/Cr/Au, Ti/Al/Co/Au, Cr/Al/Cr/Au, Cr/Al/Pt/Au, Cr/Al/Pd/Au, Cr/Al/Ti/Au, Cr/Al/Co/Au, Cr/Al/Ni/Au, Pd/Al/Ti/Au, Pd/Al/Pt/Au, Pd/Al/Ni/Au, Pd/Al/Pd/Au, Pd/Al/Cr/Au, Pd/Al/Co/Au, Nd/Al/Pt/Au, Nd/Al/Ti/Au, Nd/Al/Ni/Au, Nd/Al/Cr/Au Nd/Al/Co/A, Hf/Al/Ti/Au, Hf/Al/Pt/Au, Hf/Al/Ni/Au, Hf/Al/Pd/Au, Hf/Al/Cr/Au, Hf/Al/Co/Au, Zr/Al/Ti/Au, Zr/Al/Pt/Au, Zr/Al/Ni/Au, Zr/Al/Pd/Au, Zr/Al/Cr/Au, Zr/Al/Co/Au, TiN_x/Ti/Au, TiN_x/Pt/Au, TiN_x/Ni/Au, TiN_x/Pd/Au, TiN_x/Cr/Au, TiN_x/Co/Au, $TiWN_x$/Ti/Au, $TiWN_x$/Pt/Au, $TiWN_x$/Ni/Au, $TiWN_x$/Pd/Au, $TiWN_x$/Cr/Au, $TiWN_x$/Co/Au, NiAl/Pt/Au, NiAl/Cr/Au, NiAl/Ni/Au, NiAl/Ti/Au, Ti/NiAl/ Pt/Au, Ti/NiAl/ Ti/Au, Ti/NiAl/Ni/Au, Ti/NiAl/Cr/Au, N-type conductive indium tin oxide (ITO), cadmium tin oxide (CTO), aluminum zinc oxide (ZnO:Al), indium zinc oxide (ZnO:In), zinc gallate ($ZnGa_2O_4$), SnO_2:Sb, Ga_2O_3:Sn, $AgInO_2$:Sn, In_2O_3:Zn, P-type conductive $CuAlO_2$, LaCuOS, NiO, $CuGaO_2$ or $SrCu_2O_2$.